Report on Librarians and Gender-Based Salary Equity: University of Toronto

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Introduction

On April 15, 2019 the *Report of the University of Toronto's Provostial Advisory Group on Gender Pay Equity* was released. The Report reflected two years of substantive analysis. The two main findings of that report are as follows:

1. On average, tenured and tenure stream women faculty at the University of Toronto earn 1.3% less than comparably situated faculty who are men, after controlling for experience, field of study, seniority, and other relevant factors. Our analysis indicates that the overall raw average difference in salary between men and women tenure-stream faculty of 12% is largely explained by the fact that women in the tenure stream at the University of Toronto have fewer years of experience and work in lower-paying fields of study.

2. There is no statistically significant difference between the salaries of men and women continuing stream teaching stream faculty. This result holds for all levels of pay and is robust across all model specifications.

The Provost issued an administrative response to the Report on April 15, 2019 in which she announced that, "effective July 1, 2019, every woman faculty member who is tenured or in the tenure stream at the University of Toronto will receive a 1.3% increase to her June 30, 2019 base salary." As a result, 832 tenured and tenure stream faculty who identify as women or gender X received this increase.

In her administrative response, the Provost also committed "to conducting a similar analysis for our librarian colleagues in continuing appointments." This is that report.

Summary of Main Findings

This report on Librarians and gender-based salary equity looks at both permanent status or permanent status stream, and non permanent status stream librarians and finds the following:

1. On average, librarians who are women at the University of Toronto earn 3.9% less than comparably situated librarians who are men, after controlling for experience and whether or not a librarian holds a position as a Senior Administrator or Department Head. Our analysis indicates that the overall *raw average* difference in salary between men and women librarians of 12.8% is largely explained by the fact that women librarians at the University of Toronto have, on average, less experience and are represented at more junior ranks.

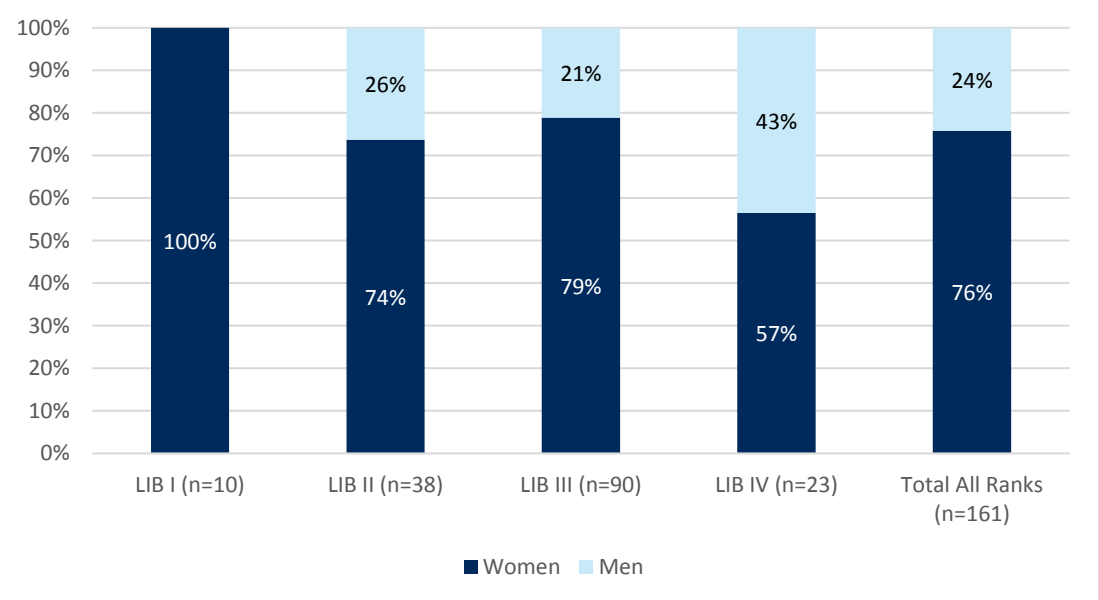
Librarians at the University of Toronto

Data on librarians were collected for the 2018-19 academic year, covering the 161 librarians (138 permanent status or permanent status stream, and 23 non permanent status stream librarians) at the University as of September 2018 across all Libraries and campuses.

Table 1. Breakdown of librarians by rank (2018-19)

	Librarian Perm Status/Perm Status Stream			Librarian NonPerm Status Stream			Total All Streams		
Rank	Women	Men	Total	Women	Men	Total	Women	Men	Total
LIB I	6		6	4		4	10	0	10
LIB II	21	6	27	7	4	11	28	10	38
LIB III	64	18	82	7	1	8	71	19	90
LIB IV	13	10	23				13	10	23
Grand Total	104	34	138	18	5	23	122	39	161

Fig 1: Fall 2018 Distribution of Librarian Gender by Rank - All Streams



Women comprised 76% of all librarians in 2018-19 (including 75% of all permanent status or permanent status stream librarians and 78% of all non permanent status stream librarians).

Base salary figures (used in all of the analysis reported below) exclude any stipends or other payments made to specific librarians.

Methodology for Estimating the Gender-Based Pay Gap

The gender pay equity analysis includes data on 161 librarians at the University of Toronto and includes both permanent status or permanent status stream, and non permanent status stream librarians. This report uses data from the University of Toronto Human Resources Information System (HRIS) which includes data on each employee of the University but was also supplemented by data held by the Central Library's Human Resources Office.

The methodology followed in this study is based closely on the methodology used in the April 15, 2019 *Report of the Provostial Advisory Group on Faculty Gender Pay Equity*.

Based on previous analyses by peer and other Canadian institutions, and relying on existing literature on the subject (particularly within the field of Labour Economics), we developed an approach to the gender pay equity analysis that is appropriate for the University of Toronto.

1. **Raw gap:** The gender-based pay gap is estimated as a percentage difference in earnings between men and women. To calculate this percentage difference, we regress the natural log of the annual salary on a gender indicator variable, which equals one if the individual is a woman.[1]
2. Since there are differences in the level of experience of women and men at the University of Toronto (e.g., the proportion of women and men varies across ranks), the gender-based pay gap cannot be properly estimated by looking only at the raw differences in earnings between men and women. Thus, in addition to gender, we include in our analysis controls for other relevant factors that influence faculty compensation. These include:
    a. **Experience:** Experience is measured as:
        i. **Rank:** The proportion of women varies at each rank (Librarian I, II, III, and IV) as shown in Figure 1. In order to ensure that we are looking at otherwise comparably situated faculty, we control for rank.
        ii. **Years since Master of Library Science:** The Master of Library Science degree is a requirement for appointment as a Librarian. Consequently, controlling for the number of years since a person received their degree is an effective way of controlling for experience.
    b. **Senior Administrator or Department Head**: Whether or not a librarian holds a position as a Senior Administrator or Department Head has an impact on salary.

[1] Because salaries at the University of Toronto have approximately a log-normal distribution, working with log-transformed salaries allows for direct estimation of percentage differences, and improves statistical inference. This is the conventional approach taken in gender pay equity studies. Using raw dollar salary amounts in place of log-transformed salaries yields the same results.

This was included as our final control. There were 16 Librarians in these roles in September 2018.

Controlling for experience and administrative roles allows us to make closer peer-to-peer comparisons of the salaries of men and women librarians, and to isolate average differences in pay between men and women that can be directly attributable to gender.

The figures in this report present point estimates for the percentage difference in earnings between men and women based on different model specifications, as well as 95% confidence intervals for these estimates.[2] The gender pay gap is statistically significant at the 95% level if the confidence interval does not overlap the value zero.

The gender indicator variable is coded “1” for women and “0” for men. Thus, a negative gap indicates that women librarians, on average, are paid lower salaries than their colleagues who are men.

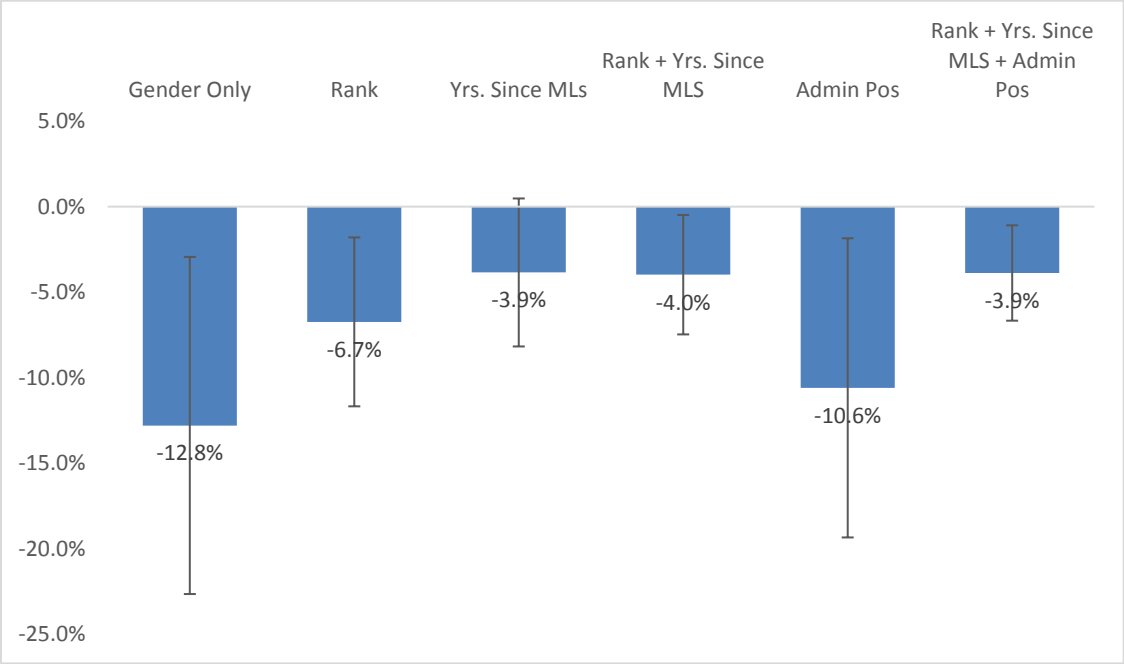
[2] The confidence interval indicates the range of values within which we can be 95% confident the true value of the wage gap lies.

Gender–Based Pay Gap Analysis – Librarians

Similar to the analysis of faculty salaries, we adopt a staged approach to examining the gender-based pay gap for librarians. First, we look at the raw differences in salary between men and women. Then we look at how each of the factors that can affect salary changes this gap. This approach allows us to estimate the gender-based pay gap based on true peer-to-peer comparisons of librarian salaries for men and women, and to illustrate the roles played by the different sets of control variables in the estimation of the gender pay gap.

Figure 2 looks at the impact of controlling for experience: measured first as rank, then as "years since Master of Library Science", and then controlling for both measures at the same time. Figure 2 then shows the impact of controlling for whether or not a Librarian holds a position as a Senior Administrator or Department Head; and then, finally, the combined impact of holding an Admistrative position , and controlling for experience, measured as rank and years since MLS.

Figure 2. Gender-based pay gap, experience (rank and "years since MLS"), and holds a position as a Senior Administrator or Department Head: Librarians



1. The first bar in Figure 2 shows a raw gender-based pay gap among all librarians of approximately 12.8%. This model explains just 5% of the variation in salaries among librarians.

2. The second bar shows the effect of controlling for rank, one of the two components of experience. The addition of this factor reduces the gap to 6.7% and increases the explanatory power to 77%.

3. The third bar shows the effect of controlling alone for the second factor that measures experience, “years since MLS”. This factor decreases the gap to 3.9% and has an explanatory power of 81%.

4. The fourth bar shows the impact of controlling for both measures of experience: rank and “years since MLS.” Including both measures together produces a gap of 4% and explains 89% of the difference in pay between comparably situated men and women librarians.

5. The fifth bar shows the impact of controlling solely for “holds a position as a Senior Administrator or Department Head.” Controlling for this factor alone yields a gap of 10.6% and has an explanatory power of 23%.

6. The sixth bar represents the final, full model. This model includes controls for experience (measured as rank and “years since MLS”), and whether or not a librarian holds a position as a Senior Administrator or Department Head. Controlling for these factors ensures that our estimates of the gender-based pay gap are based as closely as possible on true peer-to-peer comparisons. The final, full model yields a gap of 3.9%, and explains 91% of the variation in salaries. The 95% confidence bar gets close to, but does not cross zero, and we can therefore reject the null hypothesis of equal earnings between men and women.

Gender-based Pay Gap: Robustness Analysis

As we did in our analysis of faculty salaries and gender, we conduct two robustness tests to determine whether or not our analysis is sensitive to the influence of outliers (e.g., a small number of librarians with extremely high or low salaries). These tests entail estimating the full model as follows:

1. The final, full, model excluding top 5% of earners; and
2. The final, full, regression model excluding 5% of the most influential observations.[3]

Figure 3. Gender-based pay equity gap – robustness analysis: Librarians

Figure 3 shows that our model is not sensitive to outliers. Removing the top 5% of earners only slightly reduces the gap; and excluding the top 5% of influential outliers does not affect the gap at all. Given this lack of sensitivity to a subset of observations, we can safely rely on estimates generated using the full set of 161 observations.

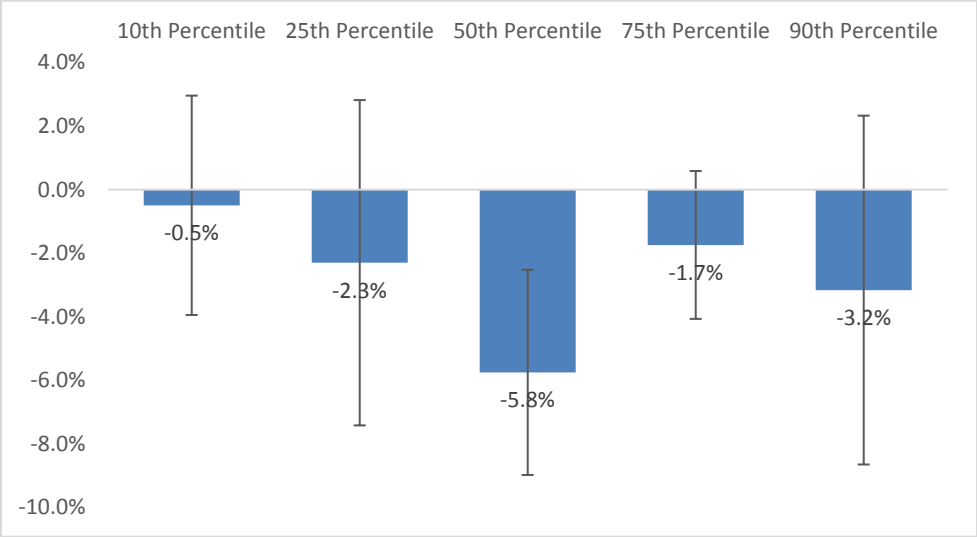
[3]The motivation for excluding the top 5% of earners is that very high salaries may dominate the overall picture, distorting the average. Similarly, excluding the 5% most influential observations is a conventional assessment of robustness to a small number of observations (not necessarily high earners) who drive the main results. The idea in such an exercise is to assess the reliability of the regression as representing the overall data, rather than being driven by a small number of observations.

Differences in the Gender-Based Pay Gap by Salary Level

The final set of analyses for librarians investigates how the gender-based pay gap varies across the salary distribution, to determine whether the gender gap is most pronounced for librarians who are among the lowest paid in the University, or for those earning the highest salaries, after controlling for the other relevant factors discussed above. Figure 4 shows the results of the final, full model using a quantile regression approach. This analysis yields an estimated gender-based pay gap at five different points on the salary distribution:

a. 10th percentile;
b. 25th percentile;
c. 50th percentile (median);
d. 75th percentile;
e. 90th percentile.

Figure 4. Quantile regression analysis: Librarians



Note that the librarian population is too small to support robust estimates of separate gender effects at each quantile of the wage distribution. However, the results in Figure 4 provide no evidence that would invalidate our main finding of a 3.9% gap.

Conclusion

The analysis of the salaries of men and women librarians at the University of Toronto found that, on average, librarians who are women at the University of Toronto earn 3.9% less than comparably situated librarians who are men, after controlling for experience, and whether or not a librarian holds a position as a Senior Administrator or Department Head. Our analysis indicates that the overall raw average difference in salary between men and women librarians of 12.8% is largely explained by the fact that women librarians at the University of Toronto have, on average, less experience and are represented at more junior ranks.

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